

# z e t e r a

Zetera White Paper on

## $\mu$ SAN<sup>TM</sup>/Linksys Opportunity

*Proposal on the use of the  $\mu$ SAN<sup>TM</sup> technology to augment the Linksys product line.*

*It is assumed that the reader of this paper is familiar with the fundamentals of IP technology. This document is further supported by the detailed Zetera White Paper on  $\mu$ SAN<sup>TM</sup> technology.*

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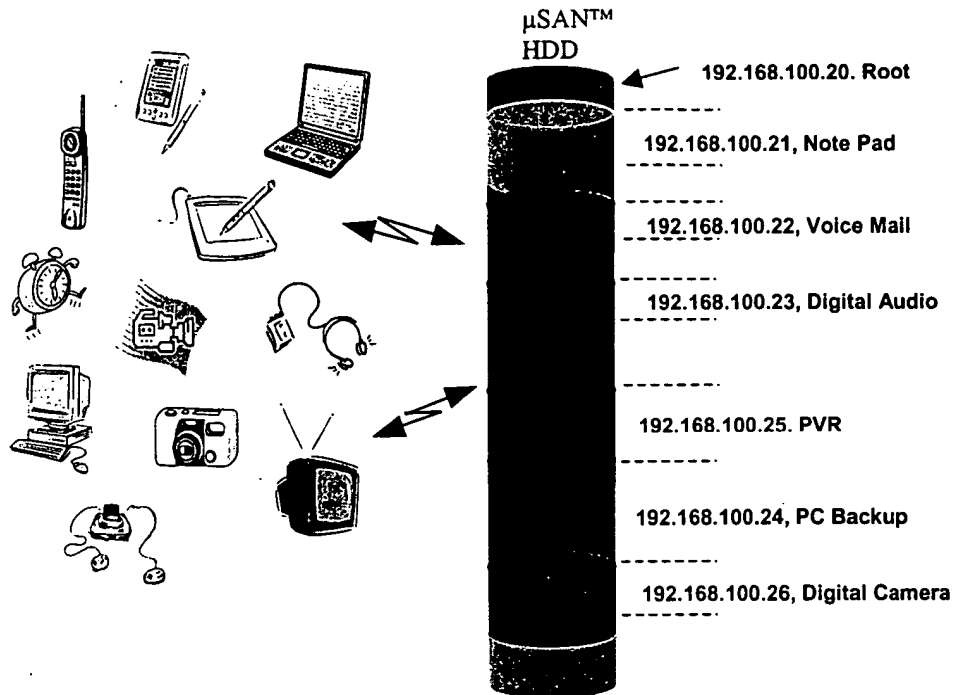
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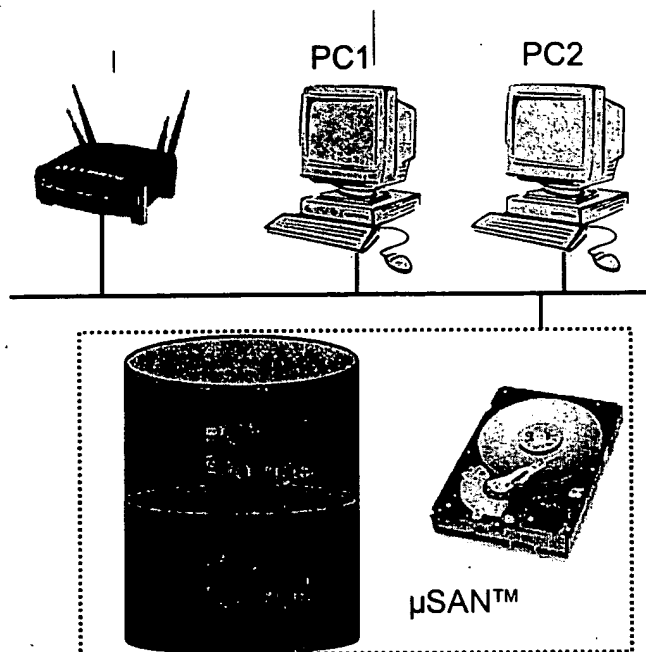
## Overview



μSAN™ technology was developed to set new standards for cost and convenience in networked computers and appliances that are enhanced by storage. The Zetera μSAN™ technology brings storage resources to the user at the component level through IP (Internetwork protocol). This offers significant advantages to the user and opens new markets.

IP is the most widely used communications protocol in the computer world and it is about to become the most widely used protocol in consumer electronics. The advantage of IP is that it is not restricted to any physical bus/protocol. It is fully addressable, routable and virtual. Consumer electronics through the entertainment media is becoming a huge user of storage on a scale similar to that of the computer. μSAN™ brings IP addressable component storage to both consumer electronics as well as the computer in such a way that it is economical, shareable, expandable, redundant and independent. Because Linksys is uniquely positioned in home IP connectivity, the migration of computer-based storage to consumer electronics storage through IP will enhance and grow the business of Linksys. Today, Linksys can offer the most economical and flexible networked storage available through μSAN™ technology.

## Simple Add-on Computer Storage



- The physical network is Ethernet, 802.x, HPNA, GbE, ...
- Each PC has a μSAN™ mini-port driver communicating with the IP stack.
- Supports Windows XP, Windows 2000, Apple, Linux ...
- No additional IP stack support is required. μSAN™ sits atop UDP or TCP.
- **Cost of the stand-alone μSAN™ is similar to USB & 1394 solutions.**
- Spanning of the drive is supported through Multicasting IP
- Mirroring (dynamic backup) is supported through Multicasting IP
- IP Addressing is supported through DHCP
- UPnP is Supported

This add-on storage solution has significant advantages to direct attached solutions such as USB or 1394. The disk is shared at the network level in a peer-to-peer relationship. The partitioning of the drive is such that each computer perceives that it “owns” its partition exclusively. Indeed, each computer is unaware of other computers sharing the drive resource. If the computers wish to share files or folders, they may do so through the standard Windows shared resource management. Neither computer must be turned on to support the other’s resources. Spanning and mirroring are supported through multicasting in a seamless manner for simple backup and expansion. Even striping for performance considerations may be performed. The protocol lives on and improves as physical networks improve in performance, reliability and QoS.

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## The Linksys Product



- HDD enclosed in a Linksys case with a μSAN™ adapter card (similar to 1394/USB solutions on the market today)
- I/O will probably be 100bT or 1GbE
- μSAN™ Windows 2000/XP Driver
- μSAN™ Apple Driver
- μSAN™ Linux Driver
- Power Adapter

Linksys marketing will determine appropriate HDD capacity/price points and packaging for the product.

Zeterra will provide the following deliverables - Available Q2/2003

- Reference design for the μSAN™ Adapter Card (R1.0) for EIDE drives and based upon ARM technology controller
  - Schematics (Cadence/Orcad)
  - PCB Layout Example (Cadence/Orcad)
  - Budgetary Costed BOM and Reference AVL
  - Assembly Drawing (AutoCAD)
  - H/W & S/W Specification (MS Word)
  - S/W (Source & Binary Code)
  - Documentation (CDROM)
- Code for the Windows 2000/XP Client Driver
- Code for the Apple Client Driver
- Code for the Linux Client Driver

Functions supported will include:

- Base μSAN™ protocol functions
- Discovery and allocation of resources
- Security and Authentication
- Volume Spanning
- Volume Mirroring